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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,369	10/05/2005	Hiroshi Matsutani	1303.44954X00	4784
20457 7590 08/07/2007 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER ZIMMER, MARC S	
			ART UNIT 1712	PAPER NUMBER
			NOTIFICATION DATE 08/07/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/529,369	Applicant(s) MATSUTANI ET AL.	
	Examiner Marc S. Zimmer	Art Unit 1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4-6 is/are allowed.
- 6) ☒ Claim(s) 1-3, 8-13 and 20 is/are rejected.
- 7) ☒ Claim(s) 7 and 14-19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>07/29/05</u> . | 6) <input type="checkbox"/> Other: _____ |

Claim Objections

Claims 7 and 15-19 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiply dependent claim. See MPEP § 608.01(n). Accordingly, these claims have not been further treated on the merits.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 13-14, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchimaru et al., JP 2002-155144 in view of Kirner et al., U.S. Patent Application Publication No. 2003/0224156 or Mercer et al., U.S. Patent # 5,179,188. Uchimaru et al. disclose essentially the same invention as is presently claimed with the notable exception that there is no indication that the catalyst is removed and, hence, the leak current limitation is ostensibly not satisfied.

On the other hand, it is widely documented in the prior art that it is unfavorable for there to be any significant quantities of metal-based impurity (which a catalyst residue may be regarded as) in a polymer composition that is employed as a dielectric film-forming material in the context of manufacturing electronic devices. See, for instance, paragraph 13 of *Kirner* and column 10, lines 42-44 of *Mercer*. It would, therefore, have been obvious to the skilled artisan that measures should be taken to

isolate the catalyst from the polymer disclosed by Uchimaru prior to its application as a dielectric film. (For the purpose of rejecting claims 1-3, 6, 13-14, and 20, it is not important that the *Kirner* and *Mercer* advocate a particular method of removing the catalyst; only that they teach the importance of minimizing metal content thereby motivating one of ordinary skill to remove the platinum residue from the *Uchimaru* invention.)

Claims 1-3, 13-14, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the abstract entitled "Evaluation of Low-k Polymer Film containing Borazine Unit" authored by Uchimaru et al. and published in Extended Abstracts (the 62nd Autumn Meeting, 2001); *The Japan Society of Applied Physics and Related Societies*, September 11-14, 2001, pg. 656 in view of Kirner et al., U.S. Patent Application Publication No. 2003/0224156 or Mercer et al., U.S. Patent # 5,179,188. This document teaches the formation of copolymers derived from equivalent borazine compounds and an organosilicon compound embraced by Formula 4 on page 31 of the Specification.

Kirner and *Mercer* are relevant for the same reasons mentioned under the first statement of rejection.

Claims 1-3, 13-14, and 20 rejected under 35 U.S.C. 102(b) as being anticipated by the abstract for an article entitled "Borazine-Siloxane Polymer and it's Application" authored by Inoue et al. and published in the Proceedings of the Symposium on

Semiconductors and Integrated Circuits Technology, 2002, 63, pg. 96-101 in view of Kirner et al., U.S. Patent Application Publication No. 2003/0224156 or Mercer et al., U.S. Patent # 5,179,188. This document teaches the formation of copolymers derived from equivalent borazine compounds and an organosilicon compound embraced by Formula 2 on page 32 of the Specification

Kirner and *Mercer* are relevant for the same reasons mentioned under the first statement of rejection.

Claims 8, 9, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchimarū, Kirner, and Mercer as applied to claims 1-3, 13-14, and 20 above, and further in view of Monkiewicz et al., U.S. Patent # 6,100,408.

It is acknowledged that neither *Kilner* nor *Mercer* teach an approach for removing the metal impurities inherently present in the invention to *Uchimarū*. Further, that both of these references disclose the employment of different materials as the dielectric polymer and, thus, would likely contain different impurities, the skilled artisan would not rely on any teachings therein for the removal of the platinum metal impurity present in *Uchimarū*. Instead, the skilled artisan would consult the prior art directed to solving the problem of the removal of platinum hydrosilylation catalysts such as those contemplated by *Uchimarū*. In this connection, *Monkiewicz* teaches specific disadvantages associated with the employment of homogeneous catalysts of the type disclosed in *Uchimarū*, i.e. the difficulty of their removal and the inability to exert control over the reaction conditions (column 1, lines 56-58.) As a means of addressing those issues,

Monkiewicz teaches the utilization of heterogeneous catalysts supported on nonmetallic supports (column 2, lines 44-60). At the conclusion of the reaction, the catalyst may be removed by simple filtration.

Claims 8, 9, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Uchimarū abstract, Kirner, and Mercer as applied to claims 1-3, 13-14, and 20 above, and further in view of *Monkiewicz et al.*, U.S. Patent # 6,100,408.

Monkiewicz is relevant for the same reasons mentioned earlier.

Claims 8, 9, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue, Kirner, and Mercer as applied to claims 1-3, 13-14, and 20 above, and further in view of *Monkiewicz et al.*, U.S. Patent # 6,100,408.

Monkiewicz is relevant for the same reasons mentioned earlier.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchimarū, Kirner, and Mercer as applied to claims 1-3, 13-14, and 20 above, and further in view of *Montegi et al.*, U.S. Patent # 5,115,069. As before, *Kilner* nor *Mercer* teaches a strategy for removing the residue expected to be present in the dielectric material taught by *Uchimarū*. Accordingly, the skilled artisan would refer to the prior art pertaining to the removal of hydrosilylation catalyst. *Montegi* discloses a technique wherein the product mixture is agitated with carbon particles that adsorb the platinum and, subsequently, are filtered (paragraph bridging columns 3 and 4). The skilled

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artisan will appreciate that this same approach may be employed to remove the platinum residue inherent in the composition taught by *Uchimarū*.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the *Uchimarū* abstract, Kirner, and Mercer as applied to claims 1-3, 13-14, and 20 above, and further in view of *Montegi et al.*, U.S. Patent # 5,115,069.

Montegi is relevant for the same reasons mentioned earlier.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue, Kirner, and Mercer as applied to claims 1-3, 13-14, and 20 above, and further in view of *Montegi et al.*, U.S. Patent # 5,115,069.

Montegi is relevant for the same reasons mentioned earlier.

As an aside, it is appreciated that the reasons why Montegi and Monkiewicz are desirous of removing the platinum metal are not the same as the skilled practitioners motivation for removing platinum from the polymer disclosed by *Uchimarū* and Inoue however this is of no consequence whatsoever. Indeed, the actual motivation to remove the platinum metal is provided by Kirner and Mercer. Montegi and Monkiewicz merely outline different methods of accomplishing this objective.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the

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unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3 are rejected on the ground of nonstatutory double patenting over claims 1-19 of U. S. Patent No. 6,924,545 ('425) in view of the relevant teachings taken from Kirner and Mercer cited hereinabove since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter.

The present claims embrace a film derived from any polymer material (i) having a borazine ring therein, and (ii) that satisfies the disclosed property limitations. U.S. Patent # 6,924,425 teaches films derived from polymer materials containing borazine rings and wherein the Young's modulus and dielectric constant limitations would inherently be satisfied insofar as the prior art films are prepared using the same starting

materials outlined in Applicant's Specification. The prior art film is not, on the other hand, expected to inherently meet the leak current limitation due to the presence of platinum metal but the aforementioned references motivate one of ordinary skill to remove this component.

Claims 1 and 2 provisionally rejected on the ground of nonstatutory double patenting over claims 13 and 20 of copending Application No. 10/809,704 in view of the relevant teachings taken from Kirner and Mercer cited hereinabove. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter.

The present claims embrace a film-forming composition for preparing dielectric films comprising a polymer from trialkynyl borazaine and a compound bearing hydrosilyl groups, a solvent, and wherein an amount of the catalyst used to facilitate a reaction between the aforementioned compounds has to be below a specified threshold. The co-pending claims are directed to an equivalent insulating film-forming material. Given that said material is to be employed in an identical application, it would be obvious to remove the catalyst residue per the teachings of Kirner and Mercer. Also, the addition

of a solvent to the product described in the co-pending claims is absolutely obvious as a means of placing the material in a form more amenable to known coating methods.

Allowable Subject Matter

Claims 4-6 are allowable. The prior art does not motivate one of ordinary skill to lay down a first siloxane layer under the borazine copolymer layer.

Concerning the references cited by the ISA, the Examiner is in disagreement as to their relevance. First, the skilled artisan will appreciate that there is often a compromise to be made between optimizing dielectric constant and Young's modulus when designing a dielectric material. That the skilled artisan will appreciate that all of the properties mentioned by the claims are desirable of a dielectric film-forming material, it is no simple feat to prepare a polymer that simultaneously exhibits a comparable low dielectric constant and high modulus. It is even more egregious to suggest that the polymer disclosed in JP 2000-340689 could easily be modified to yield a polymer having the claimed properties. In fact, it might not be possible at all to do so starting with the polymer that the Japanese document teaches.

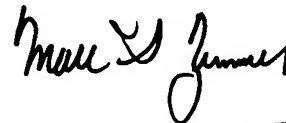
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marc S. Zimmer whose telephone number is 571-272-1096. The examiner can normally be reached on Monday-Friday 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

July 31, 2007


MARC S. ZIMMER
PRIMARY EXAMINER